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November 1998

U.S. Department of Energy
U.S. Environmental Protection Agency
Idaho Department of Health and Welfare,
Division of Environmental Quality

Proposed Plan for
Waste Area Group 1 – Test Area North
Idaho National Engineering and Environmental Laboratory

Introduction

Between the 1950s and 1980s, research activities at the Idaho National Engineering and Environmental Laboratory (INEEL) left behind contaminants that pose risks to human health and the environment. A comprehensive ***Remedial Investigation and Feasibility Study*** was initiated in 1995 to determine the nature and extent of the contamination at Test Area North. The investigation is detailed in the *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Labo-*

*Note: When technical or administrative terms are first used, they are printed in **bold italics** and explained in the margin. Additional information (🛈) is also provided in the margin. Referenced documents are listed at the end of this plan.*

Remedial Investigation and Feasibility Study: A study that identifies what contaminants are present in an area and assesses the risk they pose to human health and the environment. The study also evaluates ways the contamination could be remedied. A Comprehensive Remedial Investigation and Feasibility Study is the extensive, final study for an area that reviews previous cleanup decisions and activities, assesses combined impacts of all release sites, and evaluates risk for an entire area.

How You Can Participate

READ the Proposed Plan and review related documents in the INEEL Administrative Record (see page 2 for details).

CALL the INEEL at 1-800-708-2680 or 208-526-7225 for more information or to schedule a briefing.

CONTACT the State of Idaho, EPA, or DOE project managers or the INEEL Community Relations Office to discuss this Proposed Plan (see page 29 for details).

COMMENT on this Proposed Plan (a postage-paid comment form is provided on the back cover).

Inside This Plan

Agencies: The U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the State of Idaho — the three agencies responsible for the scope and schedule of remedial investigations at the INEEL.

Administrative Record: The collection of information, including reports, public comments, and correspondence, used by the Agencies to select a cleanup action.

The INEEL Administrative Record is available to the public at the following locations:

INEEL Technical Library
DOE Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83415
208-526-1185

Albertsons Library
Boise State University
1910 University Drive
Boise, ID 83725
208-385-1621

University of Idaho Library
University of Idaho Campus
434 2nd Street
Moscow, ID 83843
208-885-6344

and on the Internet at:
http://ar.inel.gov/home.html

Record of Decision: A public document that explains which remedy will be used at a site and why. The Responsiveness Summary contains the public comments received on the proposed actions and the Agencies' responses.

National Priorities List: The EPA's formal list of the nation's hazardous waste sites that have been identified for possible remediation. It ranks sites based on their potential risk to human health and the environment.

Federal Facility Agreement and Consent Order: An agreement among the Agencies to evaluate potentially contaminated sites at the INEEL and perform remediation, if necessary.

ratory report.[1] A Comprehensive Investigation Supplement[2] was also prepared to provide additional information to help the ***Agencies*** and the public to evaluate the alternatives.

This proposed plan summarizes the risks associated with nine sites at Test Area North and describes possible cleanup alternatives. It presents the Agencies' preferred cleanup strategy for each site and explains the basis for the preference. The Comprehensive Investigation Report, Comprehensive Investigation Supplement, and related documents are available in the INEEL ***Administrative Record.***

The Agencies identified and concurred on the preferred cleanup alternatives presented in this proposed plan. Final selection of the cleanup alternatives will consider community acceptance of the alternatives, as indicated by the comments received during the public comment period (November 23 through December 22, 1998). Public review of and comment on all the alternatives is encouraged. The Agencies will consider all comments during final selection of the cleanup alternatives. Comments received will be summarized and responded to in the Responsiveness Summary section of the ***Record of Decision***, which is scheduled for completion in September 1999.

Background

The INEEL is an 890-square mile DOE facility on the Eastern Snake River Plain in southeastern Idaho (Figure 1). The Eastern Snake River Plain is a relatively flat, semiarid desert. Drainage within and around the plain recharges the Snake River Plain Aquifer, which flows beneath the INEEL and surrounding area. The top of the aquifer slopes from about 200 feet below the surface at Test Area North to about 600 feet below the surface at the Radioactive Waste Management Complex. The aquifer is overlain by lava flows and sediment.

Because of confirmed contaminant releases to the environment, the INEEL was placed on the ***National Priorities List*** of hazardous waste sites in 1989. The Agencies signed the ***Federal Facility Agreement and Consent Order*** in 1991 outlining the cleanup process and schedule for the INEEL. To better manage cleanup activities, the INEEL was divided into 10 waste area groups; Test Area North is designated as Waste Area Group 1.

Test Area North is in the north-central portion of the INEEL (see Figure 1). From 1954 to 1961, the area was used to support the Aircraft Nuclear Propulsion Program, whose mission was to test the concept of a nuclear-powered airplane. From 1962 through the 1970s, the area was principally devoted to the Loss-of-Fluid Test (LOFT) Facility, which was used to perform reactor safety testing and behavior studies. Beginning in 1980, the area was used to conduct work with material from the 1979 Three Mile Island reactor accident. Current activities include the manufacture of armor for military vehicles at the Specific Manufacturing Capability (SMC) Facility and nuclear inspection and storage operations at the Initial Engine Test (IET) Facility, the Technical Support Facility (TSF), and the Water Reactor

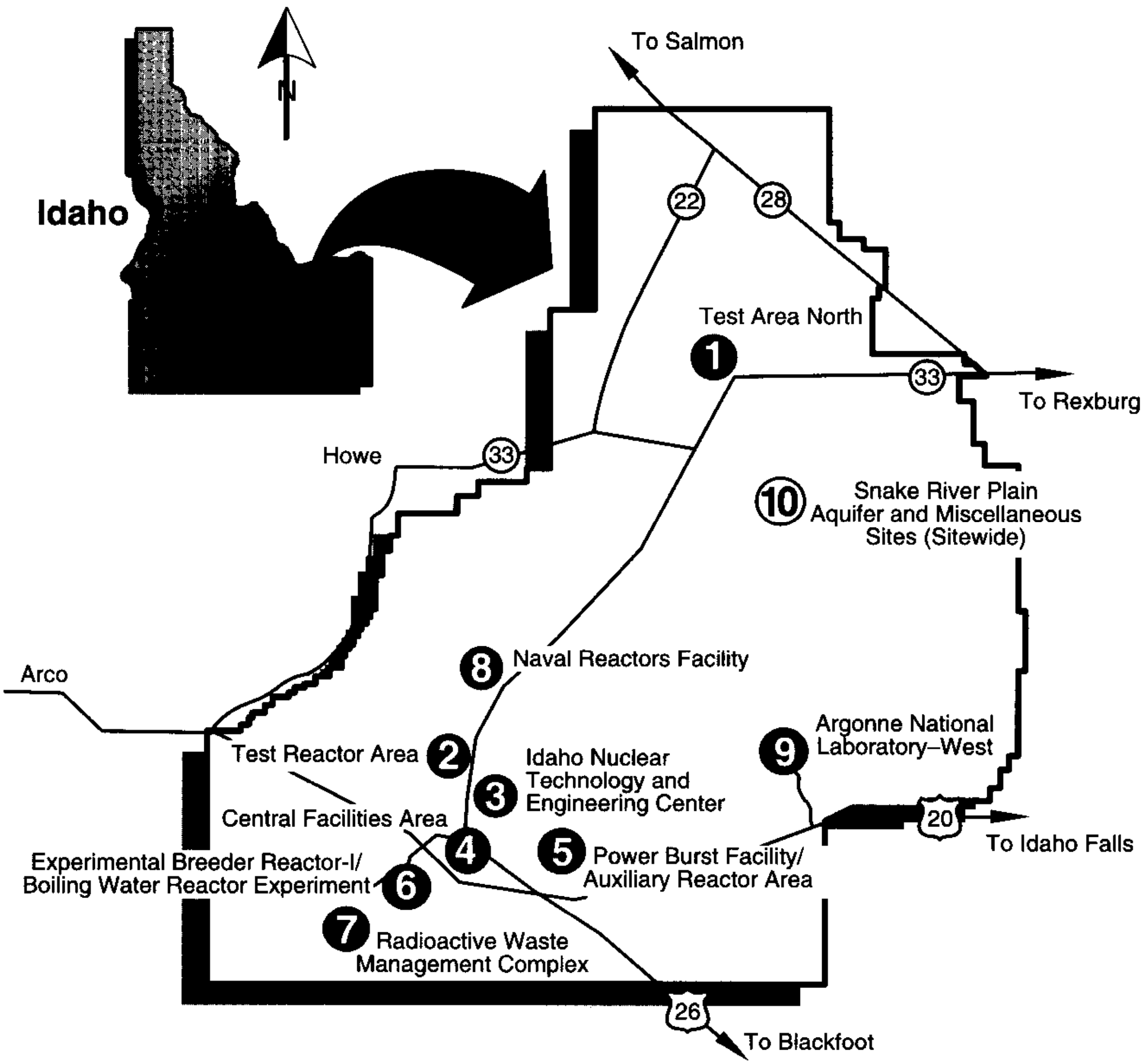

Figure 1. Waste Area Groups at the INEEL.

Research Test Facility (WRRTF). Figure 2 is an aerial overview of Test Area North, and Figures 3, 4, and 5 are maps of the facilities at Test Area North.

The main sources of contamination at Test Area North include discharges to an injection well, releases during transfers to and from underground storage tanks, windblown contaminants from another release site, releases in disposal (burn) pits, releases to surface ponds, a mercury spill, and a fuel leak.[3]

The INEEL lies within the lands traditionally occupied by the Shoshone-Bannock Tribes. The tribes have used the land and waters within and surrounding the INEEL for fishing, hunting, and plant gathering, in addition to medicinal, religious, ceremonial, and other cultural uses. Under a cooperative agreement[4] between the tribes and DOE, some tribal activities continue today within the INEEL boundaries.

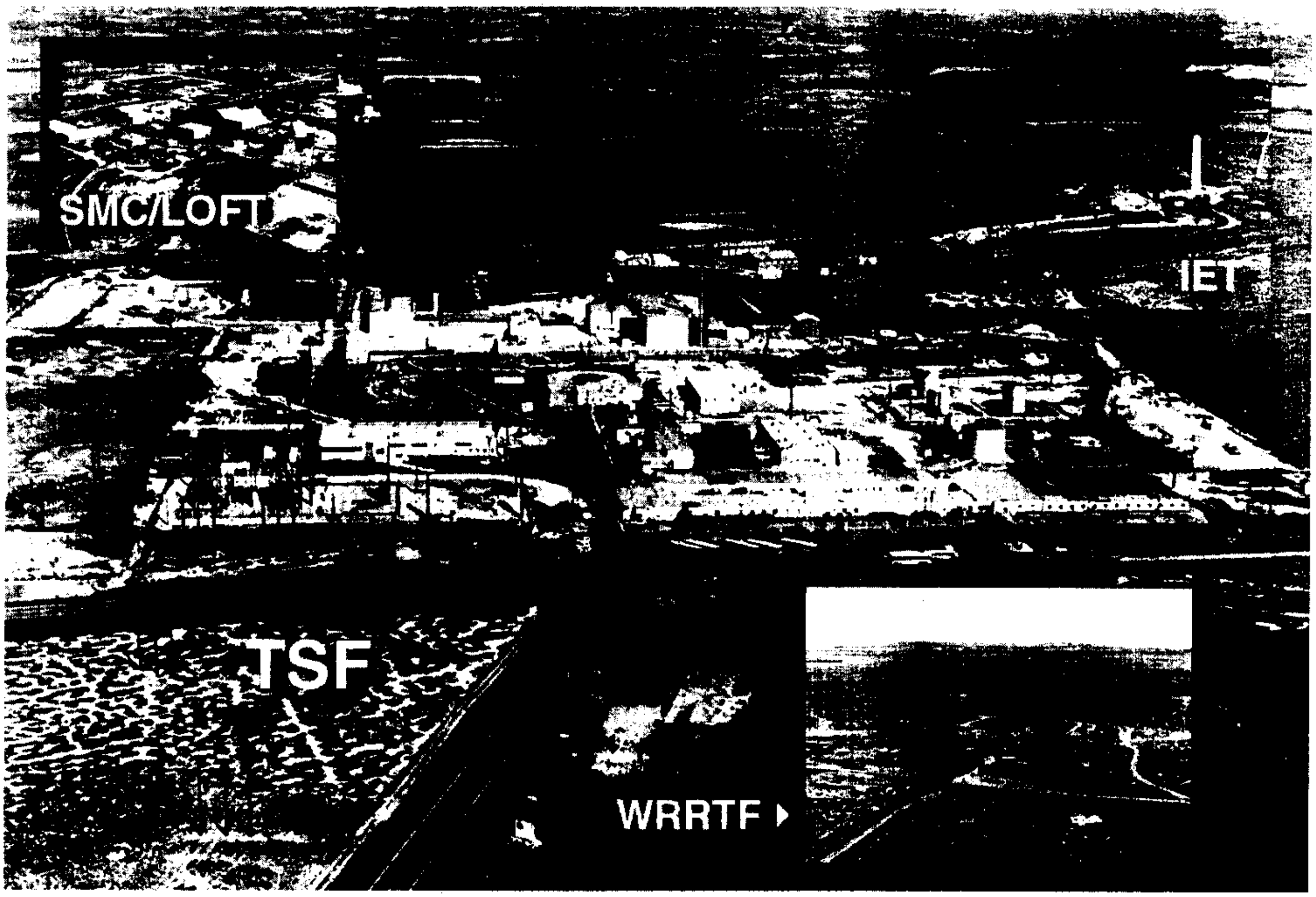

Figure 2. Facilities at Test Area North (all photographs from around 1995, except IET, from around 1985).

Investigation activities, such as site characterization and removal actions, generate contaminated soil, debris, sampling equipment, and personal protective equipment. This waste is referred to as investigation-derived waste. It is disposed of throughout the assessment process. Investigation-derived waste currently being stored and waste generated during future cleanup actions will be disposed of in compliance with regulations.

remedial action objectives: Specific requirements that must be met by the cleanup remedy.

Since 1991, 94 potential release sites have been studied at Test Area North. This number includes 79 sites originally identified in the Federal Facility Agreement and Consent Order,[5] plus 15 additional sites identified during the comprehensive investigation.[6]

Thirty-two sites were addressed in 1995 in the *Record of Decision for the Technical Support Facility Injection Well (TSF-05) and Surrounding Groundwater Contamination (TSF-23) and Miscellaneous No Action Sites Final Remedial Action.*[7] Thirty of the 32 sites pose no unacceptable risk at the present time for the current or future worker or the future resident. Cleanup activities at the remaining two sites are on track to meet the ***remedial action objectives;*** therefore, only post-cleanup contaminant levels for the areas were evaluated in the comprehensive investigation.

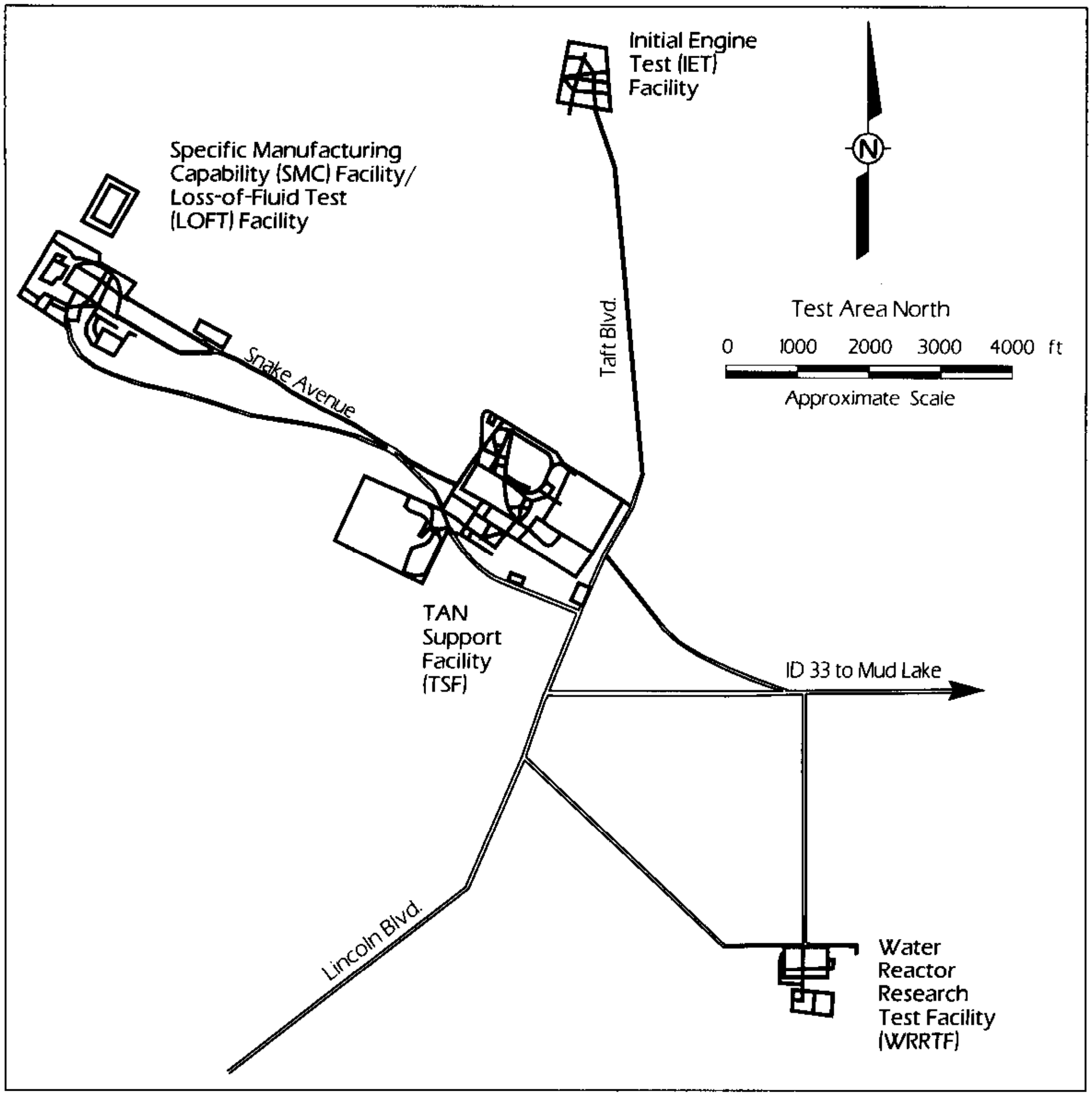

***Figure 3.** Map of Test Area North facilities.*

The comprehensive investigation examined the 62 remaining potential release sites. Of these, 53 were determined not to require cleanup activities (see page 26 for a discussion of these sites). Nine sites (see Figures 4 and 5) are contaminated with ***heavy metals***, ***radionuclides***, ***organic compounds***, ***polychlorinated biphenyls (PCBs)***, or combinations of these. These sites pose an unacceptable risk to human health or the environment and will be addressed by the selected remedies resulting from this proposed plan. Any remaining potential release sites are located near active facilities and will be further assessed when those facilities are closed.[8] Current policies in place at the active facilities protect workers and the environment.

heavy metals: Metallic elements with high atomic weight that can damage living things at low concentrations and tend to accumulate in the food chain. Examples are mercury and lead.

radionuclides: Alternate forms, or isotopes, of an element that are unstable and decay by giving off energy in the form of radioactivity. Examples are cesium-137 and uranium-235. Prolonged exposure may be harmful.

organic compounds: Chemicals containing carbon. Examples are petroleum products, petroleum-based solvents, and pesticides. Exposure to some organic compounds can produce toxic effects in body tissues and processes.

polychlorinated biphenyls (PCBs): A specific type of organic compound that is carcinogenic (cancer-causing) and is known to accumulate in the environment. EPA requires specific treatment technologies to address PCB contamination.

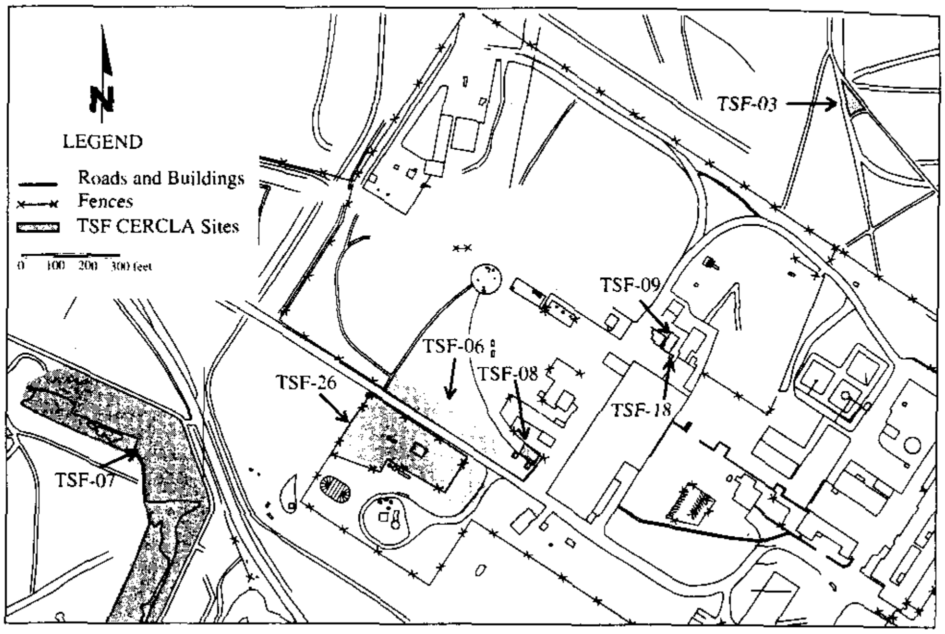

Figure 4. Contaminated sites at TSF: TSF-03 (Burn Pit); TSF-06, Area B (Soil Contamination Area South of the Turntable); TSF-07 (Disposal Pond); TSF-08 (Mercury Spill Area); TSF-09 and TSF-18 (V-Tanks); TSF-26 (PM-2A Tanks).

Test Area North Contaminants of Concern

V-Tanks (TSF-09 and TSF-18)*
cesium-137 and other radionuclides[9]
heavy metals
organic compounds
PCBs

PM-2A Tanks (TSF-26)*
cesium-137 and other radionuclides[10]
heavy metals
organic compounds
PCBs

Soil Contamination Area South of the Turntable (TSF-06, Area B)
cesium-137

Disposal Pond (TSF-07)
cesium-137

Burn Pits (TSF-03 and WRRTF-01)
lead

Mercury Spill Area (TSF-08)
mercury

Fuel Leak (WRRTF-13)
oils and diesel fuel

* The only contaminant of concern in the soil at these sites is cesium-137. The other contaminants are in the tank contents.

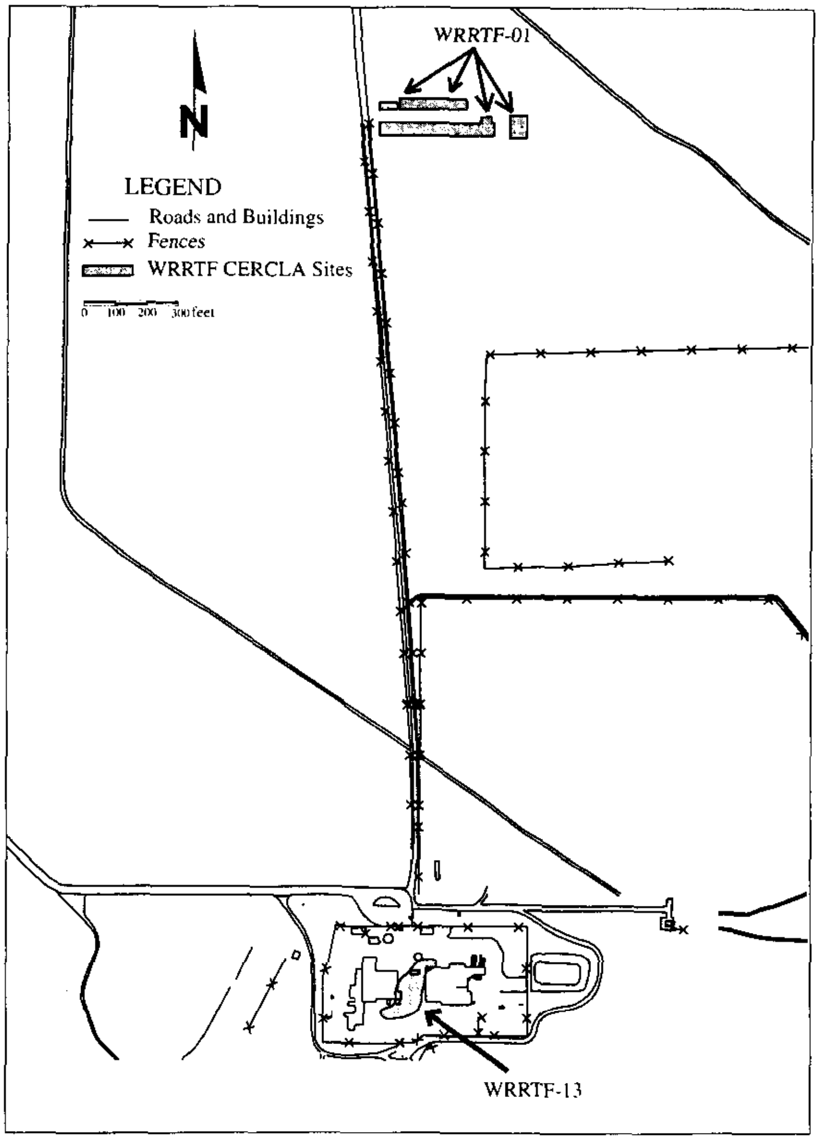

Figure 5. Contaminated sites at WRRTF: WRRTF-01 (Burn Pit) and WRRTF-13 (Fuel Leak).

Summary of Site Risks

The ***risk assessment*** of contaminated areas at Test Area North used data from the comprehensive investigation, toxicity values, assumptions, computer modeling, and hypothetical scenarios.[11] The risk assessment examined three major areas:

- *Contaminants of Concern:* What contaminants are present that might pose a risk to human health or the environment, and how toxic are they?
- *Pathways:* How might humans, animals, or the environment come in contact with the contaminants of concern?
- *Receptors:* What or who might be exposed?

The human health risk assessment quantified potential carcinogenic (cancer-causing) and noncarcinogenic adverse health effects.[12] The assessment was based on a hypothetical residential scenario. This scenario assumed a loss of ***institutional control***, after which a residence might occupy the contaminated site in 100 years and at which the residents might engage in subsistence farming. This scenario is believed to allow for all impacts of any reasonably anticipated future land use. The assessment also examined the potential risk to current and future workers.

The two scenarios, residential and occupational, evaluated relevant exposure pathways. For example, in the case of the residential scenario with subsistence farming, the evaluation included the following: ingestion of contaminated soil, groundwater, and homegrown produce; inhalation of volatile organic compounds and contaminated dust; external radiation; skin absorption; and indoor water use.

A preliminary ecological risk assessment evaluated contaminants and their pathways to ecological receptors to determine adverse effects.[13] The assessment included species that are common to Test Area North, as well as threatened or endangered species known to exist at the facility. Two sites, the LOFT Disposal Pond and the WRRTF Evaporator Pond, exhibited an ecological risk but not an unacceptable risk to human health. The impacts to sitewide ecological receptors will be further evaluated as part of the Waste Area Group 10 investigation.

Two measures are used to evaluate the significance of the risk assessment results: ***excess cancer risk*** and ***hazard index***. If the results indicate an excess cancer risk of 1 chance in 10,000 or greater, consideration is given to the need for remediation of the site. Similarly, if the hazard index for humans or ecological receptors exceeds 1, site remediation is considered. Table 1 summarizes the risk assessment results for the nine sites at Test Area North that exceed these thresholds.[14]

risk assessment: The process of estimating the current and future adverse health impacts to humans and the environment if no action were taken to remediate a site.

Risk was assessed for two categories of receptor: human and ecological. Human health risk assessment evaluates the potential adverse health impacts to humans. Ecological risk assessment evaluates the adverse effects not only to animals, such as birds, reptiles, and mammals, but also to media, such as air and water.

A hypothetical scenario is a forecast of potential land use. It predicts activities that reasonably might take place on the land in question and that would expose an individual to the most pathways or the highest concentrations of contaminants. This is referred to as a "reasonably maximum exposed individual assumption."

institutional control: Restriction on access to the area of concern. Controls can include fencing or other physical barriers, security, warning signs, and land-use restrictions. Controls cannot be assumed to be effective beyond 100 years.

excess cancer risk: The increased risk of cancer resulting from exposure to contaminants at a release site.

hazard index: A ratio between the contaminant intake concentrations and the concentrations that are not likely to cause adverse health effects, even to sensitive populations such as pregnant women or children.

Table 1. Nine Test Area North sites at which risks to human health and the environment exceed threshold levels. Risks exceeding threshold levels (excess cancer risk greater than 1 in 10,000; hazard indices greater than 1) are shaded.

	Human Health Risk				Ecological Risk[a]
	Occupational Scenario		Residential Scenario		
Site	Excess Cancer Risk	Hazard Index	Excess Cancer Risk	Hazard Index	Hazard Index
V-Tanks (TSF-09 and TSF-18)	**8 in 10,000**	0.00001	**4 in 1,000**	1	<1
PM-2A Tanks (TSF-26)	**1 in 1,000**	0.00001	**2 in 1,000**	1	<1
Soil Contamination Area South of the Turntable (TSF-06, Area B)	1 in 10,000	0.00001	**3 in 10,000**	1	<1
Disposal Pond (TSF-07)	1 in 10,000	0.00001	**3 in 10,000**	**3[b]**	**>1**
Burn Pits (TSF-03 and WRRTF-01)	—[c]	—[c]	—[c]	—[c]	**>1**
Mercury Spill Area (TSF-08)	8 in 10,000,000[d]	0.00001	1 in 10,000[d]	**30**	**>1**
Fuel Leak (WRRTF-13)	—[e]	—[e]	—[e]	—[e]	**>1**

a. Hazard index numbers for ecological risk are based on the preliminary screening.
b. The residential scenario hazard index is principally a result of mercury (hazard index = 1). The rest of the value is produced by contaminants with individual hazard indices less than 1.
c. Calculation of numeric health risk values for lead is not possible. Instead, the EPA residential screening level for lead was used to determine the need for cleanup.
d. The excess cancer risk for the Mercury Spill Area results from the presence of radionuclides.
e. Calculation of numeric health risk values for fuel is not possible. Instead, State of Idaho residential guidelines were used to determine the need for cleanup.

Evaluation Criteria and Process

During the Test Area North comprehensive investigation, cleanup alternatives for the sites posing unacceptable risk were developed based on experience gained during cleanup activities at other INEEL sites and other areas throughout the U.S. with similar characteristics. Alternatives must be evaluated against the nine criteria defined by ***CERCLA***.[15] These nine criteria encompass the legal requirements[16] as well as other technical, economic, and practical factors. They are used to gauge the overall feasibility and acceptability of remedial alternatives.

The first two criteria — overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs) — are considered "threshold criteria." An alternative *must* meet the threshold criteria to be considered for selection. The next five criteria are "balancing criteria" and are used to weigh major trade-offs among the alternatives. The final two criteria, called "modifying criteria," measure acceptance of the alternatives by the state, the ***support agency***, and the community.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act): The federal law that establishes a program to identify, evaluate, and remediate sites where hazardous substances may have been released (leaked, spilled, or dumped) to the environment.

support agency: The U.S. Environmental Protection Agency. The State of Idaho is the lead agency.

The first seven criteria were evaluated in the feasibility study, the results of which are presented in this proposed plan. Public comment is requested to evaluate community acceptance of the preferred alternatives. Public input could result in the modification of cleanup alternatives. Agency concurrence is demonstrated by the signing of the Record of Decision.

To further guide the selection of alternatives, remedial action objectives were developed to define specific goals the cleanup action must achieve.[17] For the nine sites covered in this proposed plan, the remedial action objectives are to:

- Prevent release to the environment of contaminants of concern from the V-tank and PM-2A tank sites.
- Reduce risk from external radiation exposure from cesium-137 to a total excess cancer risk of less than 1 in 10,000 for the hypothetical resident 100 years in the future and the current and future worker.
- Prevent direct exposure to lead at concentrations over 400 mg/kg, the EPA residential screening level for lead.[18]
- Prevent direct exposure to total petroleum hydrocarbon constituents at concentrations over 1,000 mg/kg, in accordance with the State of Idaho Risk-Based Corrective Action guidance.[19]

The process of evaluating alternatives requires that the "No Action" Alternative be evaluated for each site to establish a baseline for comparison.[20] Under the No Action Alternative, no cleanup action of any type would be performed. Environmental monitoring would continue under the No Action Alternative for 100 years. Because the No Action alternatives do not meet the threshold criteria, they are not discussed further in this plan.

Costs for each alternative are calculated in terms of ***net present value***. Capital costs are those required to carry out the remediation. They include the costs of design, construction, and treatment. Operating and maintenance costs cover the labor and maintenance required to ensure remediation remains effective.[21]

For any remedial action that leaves contamination in place (such as limited action and containment), two follow-on actions will take place. Environmental monitoring will be conducted to ensure the action continues to protect human health and the environment, and 5-year site reviews will be conducted to verify the cleanup actions remain protective.

Description of Sites and Evaluation of Alternatives

Nine sites at Test Area North pose unacceptable risk. For each site, this plan describes the site and nature of contamination, identifies and evaluates the cleanup alternatives, and identifies the Agencies' preferred alternative.[22] A summary of the sites and the preferred alternative for each is included at the end of this plan along with the comment form. The specific laws or regulations that apply to the nine sites are listed in Table 9-1 of the Comprehensive Investigation Report.

CERCLA Evaluation Criteria

Threshold Criteria

✓ **Overall protection of human health and the environment**
Does the alternative protect human health and the environment by eliminating, reducing, or controlling the risk?

✓ **Compliance with applicable or relevant and appropriate requirements (ARARs)**
Does the alternative meet environmental regulations?

Balancing Criteria

✓ **Long-term effectiveness and permanence**
Does the alternative reliably protect human health and the environment over time? Once cleanup goals have been met, will protection be maintained?

✓ **Short-term effectiveness**
Does the alternative pose any adverse impacts to human health or the environment during implementation?

✓ **Reduction of toxicity, mobility, or volume through treatment**
Does the alternative use treatment to reduce the toxicity, mobility, or volume of the contaminants?

✓ **Implementability**
How difficult is implementation of the alternative? Are the necessary materials and services available?

✓ **Cost**
What are the estimates for capital costs and for operating and maintenance costs?

Modifying Criteria

✓ **State and support agency acceptance**
Do the state and support agency concur with the preferred alternative?

✓ **Community acceptance**
Does the public's general response support the preferred alternative?

net present value: A way to calculate cost estimates that factors in inflation but allows for equal comparison of long-term and short-term alternatives.

The numbering of alternatives in this proposed plan is not always sequential due to some alternatives being screened out during the feasibility study.

V-Tanks
(TSF-09 and TSF-18)

Contaminants of Concern*
cesium-137 and other radionuclides[9]
heavy metals
organic compounds
PCBs

* The only contaminant of concern in the soil at these sites is cesium-137. The other contaminants are in the tank contents.

Alternatives Evaluated

2. Soil and Tank Removal, Ex Situ Treatment of Tank Contents, and Disposal
3. Soil Excavation and Disposal, In Situ Stabilization of Tank Contents
4. In Situ Vitrification

Preferred Alternative: 4 - In Situ Vitrification

Advantages
- Destroys organic compounds and PCBs
- Immobilizes radionuclides and heavy metals
- Reduces contaminant volume

Disadvantages
- Radionuclides and heavy metals remain in place, requiring institutional controls and long-term monitoring

Total Cost (in millions; net present value)

Capital	$ 9.6
Operating and Maintenance	0.9
Total	$ 10.5

V-Tanks

The two V-tank sites (TSF-09 and TSF-18) have similar attributes and are located in the same area (see Figure 4).[23] For this reason they were evaluated together. One site (TSF-09) includes three abandoned 10,000-gallon underground storage tanks approximately 10 feet below the ground surface, the contents of the tanks, and the surrounding soil. Two of the tanks each contain approximately 1,200 gallons of liquid and between 450 and 550 gallons of sludge. The third tank contains approximately 6,000 gallons of liquid and 680 gallons of sludge.

The second V-tank site (TSF-18) includes an abandoned 400-gallon underground storage tank approximately 7 feet below the ground surface, a sand filter on the ground surface, the tank contents, and the surrounding soil. The tank contains approximately 110 gallons of liquid and 25 gallons of sludge.

The tanks were installed in the early 1950s as part of the system designed to collect and treat radioactive liquid effluents from Test Area North operations. The soil at the site was contaminated with cesium-137 as a result of spills when waste was transferred to and from the tanks. Sampling of the soil indicated the contaminated soil could pose a risk to current and future workers (exposure to current workers is controlled by access restrictions and other DOE procedures). The tank contents are contaminated with radionuclides, heavy metals, organic compounds, and PCBs. Three alternatives were evaluated to remediate the V-tank contents and contaminated soil.

The numbering of alternatives in this proposed plan is not always sequential due to some alternatives being screened out during the feasibility study.

Alternative 2 - Soil and Tank Removal, Ex Situ Treatment of Tank Contents, and Disposal

Description. Under Alternative 2, a temporary structure to protect workers and the environment would be built over the tank sites. The soil would be excavated, the tank contents would be removed, and the tanks would be decontaminated. The tanks would then be excavated and disposed of, and the excavated areas would be backfilled with clean soil. Institutional controls would not be required because all contamination would be removed, eliminating all exposure pathways.

Alternative 2 includes two variations (Alternative 2a3 and 2b), differing in whether treatment is ***on-site*** or ***off-site***. Alternative 2a3 consists of storing the tank waste at the Radioactive Waste Management Complex (RWMC) followed by thermal treatment at the proposed Advanced Mixed Waste Treatment Facility and disposal at the RWMC. Treatment would have to meet ***delisting*** requirements.

Alternative 2b, off-site thermal treatment, would involve primarily the same process as Alternative 2a3, but the tank contents would be shipped to the Oak Ridge National Laboratory Toxic Substances Control Act incinerator (Tennessee), which is the only facility currently designated for this type of treatment. However, with-

on-site: Use of an approved facility at the INEEL for treatment or disposal (for example, the Central Facilities Area land farm, the Radioactive Waste Management Complex, or the proposed INEEL CERCLA Disposal Facility).[24]

off-site: Use of an approved facility off the INEEL (for example, the Envirocare facility in Utah or the Waste Isolation Pilot Plant near Carlsbad, New Mexico).

out pretreatment of some contaminants, such as mercury, the waste could not be accepted at Oak Ridge. In addition, the Oak Ridge incinerator does not currently accept out-of-state waste.

Evaluation. Both variations of Alternative 2 would protect human health and the environment and would comply with the applicable regulations (treatment would have to meet delisting levels). Under both variations, the thermal treatment would reduce the toxicity, mobility, and volume of the contamination and be effective long-term because the contamination would be removed. The short-term effectiveness of Alternative 2a3 would be moderate because it would require operator attendance and maintenance, increasing the potential for worker exposure. In addition, the alternative would require transportation of contaminants across the INEEL. Implementability for both variations would be low.

delisting: The administrative removal of a specific waste from RCRA regulations. The removal is based on the waste no longer posing a threat to human health and the environment.

RCRA (Resource Conservation and Recovery Act): a federal waste management law. Its guidelines regulate transportation, treatment, storage, and disposal of waste. RCRA waste includes material that is listed on one of EPA's hazardous waste lists or meets one or more of EPA's four characteristics of ignitability, corrosivity, reactivity, or toxicity.

Alternative 3 - Soil Excavation and Disposal, In Situ Stabilization of Tank Contents

Description. Alternative 3 would involve building a temporary containment structure, excavating and disposing of the contaminated soil at an acceptable repository, and stabilizing the tank contents in place. The excavated areas would be backfilled with clean soil. Alternative 3 includes two variations, differing in the disposal location – on the INEEL (Alternative 3a) or off-site (Alternative 3b) – for the excavated soil. Because contaminants would be left in place, institutional controls and long-term monitoring would be required.

Evaluation. Both variations of Alternative 3 would protect human health and the environment and comply with the applicable regulations. Additional treatability studies would be required to demonstrate PCB and organic compound destruction. The combination of high levels of organic compounds and heavy metals may make it difficult to implement, hence implementability and long-term effectiveness would be uncertain. Both Alternative 3 variations would reduce the mobility of the contamination. Solidification could result in an increase in volume of the contaminated materials. Neither variation would reduce toxicity unless pretreatment to destroy organic compounds and PCBs were performed, which would be difficult to accomplish in situ.

The principal ARARs evaluated for the V-tank sites were the Hazardous Waste Management Act closure requirements, RCRA treatment and delisting requirements, and PCB disposal criteria.

Alternative 4 - In Situ Vitrification (Preferred ☑)

Description. Alternative 4 involves ***in situ vitrification*** of the tanks, their contents, and the surrounding soil. An electrical current would be used to melt the tanks, contents, and all contaminated soil around the tanks, which would then solidify into a glass-like material. The organic compounds, including PCBs, would be destroyed by the process. The heavy metals and radionuclides would still be present, but would be bound up in the glassy solid or contained at the surface so they could not escape into the water, air, or soil. Organic compounds and particulates released during the process would be contained and treated at the surface.

In situ vitrification: The in-place melting of material through the use of electrical current. The process turns the contaminated materials into a glass-like solid that permanently holds the contaminants within it.

Evaluation. Alternative 4 would protect human health and the environment and comply with the applicable regulations. In situ vitrification would reduce toxicity by destroying the organic compounds and PCBs. Mobility of the radionuclides and heavy metals would be reduced by dispersing them throughout and binding them into the glass-like solid. Short-term effectiveness of this alternative would be moderate. It would have the least potential for worker exposure to contaminants because the tank contents would not be directly contacted.

Following in situ vitrification, tests would be conducted to determine whether the process was successful in destroying organic compounds and PCBs and completely immobilizing metals and radionuclides. Implementability and long-term effectiveness, therefore, are both ranked moderate.

Preferred Alternative for the V-Tanks

☑ **Alternative 4 – In Situ Vitrification**

Preferred Alternative for the V-Tanks

For remediation of the V-tank sites (TSF-09 and TSF-18), the preferred alternative is Alternative 4 – In Situ Vitrification. This technology would reduce toxicity by destroying the organic compounds, including PCBs. It would immobilize the radionuclides and heavy metals by binding them into the glassy solid or containing them at the surface. In addition, it would result in the greatest volume reduction by removing all water and void space during treatment. It minimizes worker exposure to contaminants because the tank contents would not be removed. Future environmental monitoring would be required because the radionuclides and heavy metals would remain in place. Permanent markers would be installed at the site to identify the presence of hazardous materials. Implementability would be moderate. Table 2 depicts the V-tanks alternatives.

Table 2. Comparison of alternatives for the V-tanks. The preferred alternative ☑ is shaded.

	Alternatives				
	Soil and Tank Removal, Ex Situ Treatment of Tank Contents, and Disposal		Soil Excavation and Disposal, In Situ Stabilization of Tank Contents		
	On-site Thermal Treatment 2a3	Off-site Thermal Treatment 2b	On-site Disposal 3a	Off-site Disposal 3b	In Situ Vitrification ☑4
Threshold Criteria[a]					
Overall protection	Ⓥ	Ⓥ	Ⓥ	Ⓥ	Ⓥ
Compliance with ARARs	Ⓥ	Ⓥ	Ⓥ	Ⓥ	Ⓥ
Balancing Criteria					
Long-term effectiveness	●	●	◐	◐	◐
Short-term effectiveness	◐	○	◐	◐	◐
Reduction of toxicity, mobility, or volume	●	●	◐	◐	●
Implementability	○	○	◐	◐	◐
Costs (dollars in millions)[b]					
Capital costs	$ 7.8	$ 8.2	$4.1	$ 4.9	$ 9.6
Operating and maintenance costs	0.0	0.0	0.9	0.9	0.9
Total cost	$ 7.8	$ 8.2	$5.0	$ 5.8	$ 10.5

Key: Ⓥ = meets criteria; ● = best satisfies criteria; ◐ = partially satisfies criteria; ○ = least satisfies criteria; ARARs = applicable or relevant and appropriate requirements.

a. An alternative must meet the threshold criteria to be considered for selection. Each alternative either fully satisfies the criteria or does not.

b. Cost is reported in net present value.

PM-2A Tanks

The PM-2A tanks site (TSF-26) consists of two abandoned 50,000-gallon underground storage tanks and the contaminated surface soil around them (see Figure 4).[25] The volume of waste in each tank is less than 2,000 gallons. The tanks are approximately 15 feet below ground and rest in concrete cradles.

The tanks stored concentrated low-level radioactive waste from the Test Area North evaporator from 1955 to 1981. The tanks currently contain sludge contaminated with radionuclides, heavy metals, organic compounds, and PCBs. No liquids are present in these tanks because in 1981 the tanks were partially filled with material to absorb free liquid. The soil above the tanks was contaminated by spills containing cesium-137 when waste was transferred from the tanks.[26] Contaminated soil was removed in 1996 as part of an earlier removal action; however, sampling following the removal action indicated the remaining soil contamination could pose an unacceptable risk to human health (exposure to current workers is controlled by access restrictions and other DOE procedures).[27] Four alternatives were evaluated for remediation of the PM-2A tank contents and contaminated soil.

PM-2A Tanks
(TSF-26)

Contaminants of Concern*

cesium-137 and other radionuclides[10]
heavy metals
organic compounds
PCBs

* The only contaminant of concern in the soil at these sites is cesium-137. The other contaminants are in the tank contents.

Alternatives Evaluated

2. Excavation, Ex Situ Stabilization, and Disposal
3. Soil Excavation, Tank Content Removal, Treatment, and Disposal
4. Soil Excavation and Disposal, In Situ Stabilization of Tank Contents
5. Soil Excavation and Disposal, In Situ Vitrification of Tank Contents

Preferred Alternative: 3d - Soil Excavation, Tank Content Vacuum Removal, Treatment, and Disposal

Advantages
- Removal of contaminants results in high long-term effectiveness
- Easy to implement
- Cost effective

Disadvantages
- Removal and treatment processes result in potential worker exposure

Total Cost (in millions; net present value)

Capital	$ 6.3
Operating and Maintenance	0.0
Total	$ 6.3

Alternative 2 - Excavation, Ex Situ Stabilization, and Disposal

Description. Under Alternative 2, a temporary containment structure would be built over the tank site. The soil would be excavated, the tank contents would be removed and stabilized, and the tanks would be decontaminated and removed. The soil, tank contents, and tanks would then be disposed of, either on the INEEL (Alternative 2a) or off-site (Alternative 2b). The excavated areas would be backfilled with clean soil.

Evaluation. Both variations of Alternative 2 would protect human health and the environment and comply with regulations. In addition, both variations would reduce the mobility of the contaminants through stabilization. Long-term effectiveness would be high because contaminated materials would be removed. However, neither variation would provide a high degree of short-term effectiveness because removing the tanks and tank contents would increase the chance of worker exposure. Implementability of this alternative would be moderate.

The numbering of alternatives in this proposed plan is not always sequential due to some alternatives being screened out during the feasibility study.

Alternative 3 - Soil Excavation, Tank Content Removal, Treatment, and Disposal (Preferred ☑)

Description. Alternative 3 is similar to Alternative 2 except that the decontaminated tanks would remain in place. Following excavation of the contaminated soil and removal and treatment (if required) of the tank contents, the tanks would be decontaminated and then filled with an inert material like sand or grout. The excavated areas would be backfilled with clean soil.

Alternative 3 includes three variations, which differ in the technology for removing the tank contents and in the location for disposal of contaminated soil and treated materials. Under Alternative 3a, the excavated soil and treated material would be disposed of on the INEEL, while under Alternative 3b, the soil and treated material would be disposed of off-site. Both would remove the tank contents by adding water to liquefy the contents so they can be removed using pumping technology. Under Alternative 3d, contaminated soil and tank waste would be disposed of on the INEEL, but a commercially available, high-powered industrial vacuum would be used to empty the tanks without the addition of water. The vacuum would effectively mix the tank contents, resulting in a waste form that would be acceptable for on-site disposal without further treatment. Sampling would be carried out on the tank contents after they have been removed to determine whether additional treatment is required.[28] Stabilization or other treatment would be performed as required for disposal.

The principal ARARs evaluated for the PM-2A tanks site were the Hazardous Waste Management Act closure requirements and RCRA treatment and delisting requirements.

Evaluation. All three variations of Alternative 3 would protect human health and the environment and would comply with regulations. All would provide a high degree of long-term effectiveness by removing the contaminated soil and tank contents and decontaminating the tanks. However, the removal and decontamination processes increase the chance of worker exposure and, therefore, lower the short-term effectiveness. Implementability of Alternative 3 would be moderate to high. The cost of variations 3a and 3b would be relatively high, compared to other alternatives. Because use of the industrial vacuum would result in a waste form not needing additional treatment, variation 3d would result in a substantially lower cost.

Alternative 4 - Soil Excavation and Disposal, In Situ Stabilization of Tank Contents

Description. Alternative 4 would involve building a temporary containment structure, excavating contaminated soil, stabilizing the tank contents, filling the remaining space in the tanks with an inert material like sand or grout, and disposing of the excavated soil. The excavated areas would be backfilled with clean soil. Because the tank contents would remain in place, institutional controls and long-term monitoring would be required.

Two variations are included under Alternative 4. Under Alternative 4a, the excavated soil would be disposed of on the INEEL, while under Alternative 4b, the excavated soil would be disposed of off-site.

Evaluation. Both variations of Alternative 4 would protect human health and the environment and comply with the applicable regulations. Treating the tank contents in place would limit the potential for worker exposure, increasing the short-term effectiveness. Stabilization would not reduce the toxicity or volume of the waste; it would reduce mobility. Although both variations of Alternative 4 are based on a proven technology, it would be difficult to effectively treat all the waste using in situ methods. Therefore, implementability would be low. Long-term effectiveness would be moderate. Institutional controls and long-term monitoring would be required.

Alternative 5 - Soil Excavation and Disposal, In Situ Vitrification of Tank Contents

Description. Alternative 5 involves in situ vitrification of the tanks, their contents, and the surrounding soil. An electrical current would be used to melt the tanks, tank contents, and surrounding soil, which would then solidify into a glass-like material. The organic compounds would be destroyed or driven off, and heavy metals and radionuclides would be trapped inside the glassy solid or contained at the surface. Organic compounds and particulates released during the process would be contained and treated at the surface.

Alternative 5 includes two variations for soil disposal. Excavated soil outside the treatment area would be transported to an acceptable location, either on-site (Alternative 5a) or off-site (Alternative 5b). The excavated areas would be backfilled with clean soil.

Evaluation. Alternative 5 would protect human health and the environment and comply with the applicable regulations. In situ vitrification would reduce toxicity by destroying the organic compounds and PCBs. Mobility of the radionuclides and metals would be reduced by dispersing them throughout and binding them into the glass-like solid. In addition, this alternative would provide minimal worker exposure to contaminants because the tank contents would not be directly contacted. However, in situ vitrification has never been demonstrated on tanks of this size; therefore, its implementability is uncertain. Long-term effectiveness would be lower than with other treatment alternatives, because the treated tank contents would remain in place. Institutional controls and long-term monitoring would be required.

Preferred Alternative for the PM-2A Tanks

The preferred alternative to remediate the PM-2A tanks (TSF-26) is Alternative 3d – Soil Excavation, Tank Content Vacuum Removal, Treatment, and Disposal. This alternative would protect human health and the environment and comply with regulations. It would be easy to implement because a proven technology would be used and the decontaminated tanks would not need to be removed. Stabilization, if performed, would not reduce the toxicity or volume of the waste; it would reduce mobility. If treatment were performed, toxicity and volume would be reduced. Short-term effectiveness would be moderate, because worker exposure would be possible during excavation, removal, and treatment. Long-term effectiveness would be high, because contaminants would be removed. The cost would be substantially lower than for other alternatives. Table 3 shows the PM-2A tanks alternatives.

Preferred Alternative for the PM-2A Tanks

☑ **Alternative 3d – Soil Excavation, Tank Content Vacuum Removal, Treatment, and Disposal**

Table 3. Comparison of alternatives for the PM-2A tanks. The preferred alternative ☑ *is shaded.*

	Alternatives								
	Excavation, Ex Situ Stabilization, and Disposal		Soil Excavation, Tank Content Removal, Treatment, and Disposal			Soil Excavation/Disposal, In Situ Stabilization of Tank Contents		Soil Excavation/Disposal, In Situ Vitrification of Tank Contents	
	On-site Disposal 2a	Off-site Disposal 2b	Pump; On-site Disposal 3a	Pump; Off-site Disposal 3b	Vacuum; On-site Disposal ☑3d	On-site Disposal 4a	Off-site Disposal 4b	On-site Disposal 5a	Off-site Disposal 5b
Threshold Criteria[a]									
Overall protection	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ
Compliance with ARARs	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ	ⓥ
Balancing Criteria									
Long-term effectiveness	●	●	●	●	●	◐	◐	◐	◐
Short-term effectiveness	◐	◐	◐	◐	◐	●	●	◐	◐
Reduction of toxicity, mobility, or volume	◐	◐	◐	◐	◐	◐	◐	●	●
Implementability	◐	◐	◐	◐	●	○	○	○	○
Costs (dollars in millions)[b]									
Capital costs	$ 10.0	$12.8	$ 9.1	$ 12.1	$ 6.3	$ 5.2	$ 7.9	$ 12.7	$ 15.4
Operating and maintenance costs	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.9	0.9
Total cost	$ 10.0	$12.8	$ 9.1	$ 12.1	$ 6.3	$ 6.1	$ 8.8	$ 13.6	$ 16.3

Key: ⓥ = meets criteria; ● = best satisfies criteria; ◐ = partially satisfies criteria; ○ = least satisfies criteria; ARARs = applicable or relevant and appropriate requirements.

a. An alternative must meet the threshold criteria to be considered for selection. Each alternative either fully satisfies the criteria or does not.

b. Cost is reported in net present value.

Soil Contamination Area South of the Turntable (TSF-06, Area B)

Contaminant of Concern
cesium-137

Alternatives Evaluated
2. Containment
3. Excavation and Disposal

Preferred Alternative: 3a - Excavation and On-Site Disposal

Advantages
- Long-term effectiveness through consolidation of low-level radionuclide-contaminated soil in an approved repository
- Does not require long-term monitoring and institutional controls

Disadvantages
- Does not reduce contaminant toxicity, mobility, or volume through treatment
- Potential for worker exposure during excavation

Total Cost (in millions; net present value)

Capital	$ 2.5
Operating and Maintenance	0.0
Total	$ 2.5

Soil Contamination Area South of the Turntable

The Soil Contamination Area South of the Turntable (TSF-06, Area B) is an open area bounded by the TSF fence on the west, and facility roads and several adjacent structures on the east and south (see Figure 4).[29] Surface soil at the site was contaminated by wind-blown radioactive particles from the contaminated soil at the PM-2A tanks area (TSF-26). Three patches of contamination remain in a 135 by 30 meter area after previous removal actions.[30] Two alternatives were evaluated for remediation of the Soil Contamination Area South of the Turntable.

Alternative 2 - Containment

Description. Under Alternative 2, the contaminated site would be covered with either a native soil cover (Alternative 2a) or an engineered barrier (Alternative 2b). The native soil cover would be a layer of INEEL soil covered by surface vegetation or a layer of rock to control surface exposures to subsurface radionuclides. The engineered barrier would be a cap of multiple layers of native geologic materials. The cap would control surface exposures to subsurface radionuclides and inhibit plants from growing and animals from burrowing at the site. In addition, institutional controls would be required to maintain the cover until the cesium decayed to acceptable levels.

The numbering of alternatives in this proposed plan is not always sequential due to some alternatives being screened out during the feasibility study.

Evaluation. Alternative 2 would protect human health and the environment and comply with the regulations. Contamination would be left in place; however, it would be contained, resulting in moderate long-term effectiveness. This alternative would not reduce toxicity, mobility, or volume through treatment; however, it would prevent the spread of contamination from the site. There would be a possibility for worker exposure during construction of the cover, reducing the short-term effectiveness. Implementability of this alternative would be low because the alternative could not be implemented until some time in the future when roads could be moved.

Alternative 3 - Excavation and Disposal (Preferred ☑)

The principal ARAR evaluated for the Soil Contamination Area South of the Turntable was the Idaho Fugitive Dust Emissions requirements.

Description. Under Alternative 3, the contaminated soil would be excavated and disposed of either on the INEEL (Alternative 3a) or off-site (Alternative 3b) at an approved repository. The excavation would then be backfilled with clean soil.

Evaluation. Alternative 3 would protect human health and the environment and would comply with the regulations. This alternative would provide a high degree of long-term effectiveness because the contaminants would be removed. While this alternative would not reduce the volume or toxicity of the contaminants, it would reduce mobility (though not through treatment) because the contaminants would be moved to a managed area. The possibility of worker exposure to contaminants during excavation causes the short-term effectiveness of Alternative 3 to be moderate. Implementability would be high.

Preferred Alternative for the Soil Contamination Area South of the Turntable

The preferred alternative for the Soil Contamination Area South of the Turntable (TSF-06, Area B) is Alternative 3a – Excavation and On-Site Disposal. It would consolidate low-level radionuclide-contaminated soil at an approved repository and provide long-term effectiveness. Long-term monitoring and institutional controls would not be required because the contamination would be removed. Table 4 shows the Soil Contamination Area South of the Turntable alternatives.

Preferred Alternative for the Soil Contamination Area South of the Turntable

☑ **Alternative 3a – Excavation and On-Site Disposal**

Table 4. Comparison of alternatives for the Soil Contamination Area South of the Turntable. The preferred alternative ☑ is shaded.

	Alternatives			
	Containment		Excavation and Disposal	
	Native Soil Cover 2a	Engineered Barrier 2b	On-site ☑3a	Off-site 3b
Threshold Criteria[a]				
Overall protection	Ⓨ	Ⓨ	Ⓨ	Ⓨ
Compliance with ARARs	Ⓨ	Ⓨ	Ⓨ	Ⓨ
Balancing Criteria				
Long-term effectiveness	◐	◐	●	●
Short-term effectiveness	◐	◐	◐	◐
Reduction of toxicity, mobility, or volume	○	○	◐	◐
Implementability	○	○	●	●
Costs (in millions)[b]				
Capital costs	$1.7	$ 1.3	$ 2.5	$ 5.1
Operating and maintenance costs	1.1	1.3	0.0	0.0
Total cost	$ 2.8	$ 2.6	$ 2.5	$ 5.1

Key: Ⓨ = meets criteria; ● = best satisfies criteria; ◐ = partially satisfies criteria; ○ = least satisfies criteria; ARARs = applicable or relevant and appropriate requirements.

a. An alternative must meet the threshold criteria to be considered for selection. Each alternative either fully satisfies the criteria or does not.

b. Cost is reported in net present value.

Disposal Pond (TSF-07)

Contaminant of Concern

cesium-137

Alternatives Evaluated

1. Limited Action
2. Containment
3. Excavation and Disposal

Preferred Alternative: 1 - Limited Action

Advantages
- Takes advantage of natural radioactive decay in lieu of treatment
- Easy to implement
- Cost effective

Disadvantages
- Leaves contamination in place
- Does not reduce toxicity, mobility, or volume

Total Cost (in millions; net present value)

Capital	$ 0.8
Operating and Maintenance	0.8
Total	$ 1.6

Disposal Pond

The Test Area North Disposal Pond (TSF-07) is a 35-acre, unlined disposal pond southwest of the TSF (see Figure 4).[31] A 2.5-acre portion of the pond is still in use and will undergo assessment when operations cease. Five acres in the northeast corner and on the eastern edge of the pond have been contaminated. Historically, the pond received sanitary waste discharges, low-level radioactive waste, industrial wastewater, and treated sewage effluent. The active portion of the pond is permitted by the State of Idaho to receive only sanitary and industrial waste.

Initial analysis of the data from this site indicated that radium-226 was a contaminant of concern. Since industrial processes at Test Area North did not generate radium-226, an additional investigation was conducted. The investigation indicated that the radium-226 represents naturally occurring radium concentrations at the INEEL.[32]

Cesium-137 is the only contaminant of concern at the disposal pond. It will decay to acceptable levels within the 100-year institutional control period. Sampling indicates the cesium has migrated to approximately 11 feet below the bottom of the pond. Three alternatives were evaluated for remediation of the Disposal Pond site.

Alternative 1 - Limited Action (Preferred ☑)

Description. Under Alternative 1, existing management practices, including institutional controls and environmental monitoring, would continue.

Evaluation. Alternative 1 would protect human health and the environment and would comply with the regulations. Although contamination would be left in place, it would naturally decay to within acceptable levels within the 100-year institutional control period. Long-term effectiveness would be high. Short-term effectiveness would be high, because workers would not be exposed to contaminants. This alternative would not reduce toxicity, mobility, or volume through treatment; however, it would prevent the spread of contamination from the site. Because the management practices are already in place, implementability would be high.

Alternative 2 - Containment

Description. Alternative 2 would consist of covering the contaminated site with either a native soil cover (Alternative 2a) or an engineered barrier (Alternative 2b). The native soil cover would consist of a layer of INEEL soil and surface vegetation or a layer of rock to control surface exposures to subsurface radionuclides. The engineered barrier would consist of a cap of multiple layers of native geologic materials to control surface exposures to subsurface radionuclides and inhibit plants from growing and animals from burrowing. In addition, institutional controls would be required until the cesium decayed to acceptable levels.

Evaluation. Alternative 2 would protect human health and the environment and would comply with the regulations. Contamination would be left in place; however, it would be contained and will decay to within acceptable levels within 100 years, resulting in

The principal ARAR evaluated for the Disposal Pond was the Idaho Fugitive Dust Emissions requirements.

high long-term effectiveness. This alternative would not reduce toxicity, mobility, or volume through treatment; however, it would prevent the spread of contamination from the site. There would be a possibility for worker exposure during construction of the cover, reducing the short-term effectiveness. Implementability of this alternative would be moderate.

Alternative 3 - Excavation and Disposal

Description. Under Alternative 3, the contaminated soil would be excavated and disposed of at an approved repository either on the INEEL (Alternative 3a) or off-site (Alternative 3b).

Evaluation. Alternative 3 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because contaminants would be removed. This alternative would not reduce the toxicity, mobility, or volume of the contaminants through treatment; however, it would prevent the spread of contamination from the site. There would be a possibility for worker exposure during excavation, reducing the short-term effectiveness. The implementability would be moderate.

Preferred Alternative for the Disposal Pond

The preferred alternative for the Test Area North Disposal Pond (TSF-07) is Alternative 1 – Limited Action. While cesium-137 was detected in concentrations that currently pose a risk to human health and the environment at this time, radioactive decay will reduce that risk to acceptable levels within the 100-year institutional control period. Long-term monitoring and institutional controls would be required at this site until the cesium-137 decayed to acceptable levels. Table 5 shows the Disposal Pond alternatives.

Preferred Alternative for the Disposal Pond

☑ **Alternative 1 – Limited Action**

Table 5. Comparison of alternatives for the Disposal Pond. The preferred alternative ☑ *is shaded.*

	Alternatives				
		Containment		Excavation and Disposal	
	Limited Action	Native Soil Cover	Engineered Barrier	On-site	Off-site
	☑1	2a	2b	3a	3b
Threshold Criteria[a]					
Overall protection	✓	✓	✓	✓	✓
Compliance with ARARs	✓	✓	✓	✓	✓
Balancing Criteria					
Long-term effectiveness	●	●	●	●	●
Short-term effectiveness	●	◐	◐	○	○
Reduction of toxicity, mobility, or volume	○	○	○	○	○
Implementability	●	◐	◐	◐	◐
Costs (in millions)[b]					
Capital costs	$ 0.8	$ 4.0	$ 3.2	$ 20.9	$ 54.0
Operating and maintenance costs	0.8	1.6	1.3	0.0	0.0
Total cost	$ 1.6	$ 5.6	$ 4.5	$ 20.9	$54.0

Key: ✓ = meets criteria; ● = best satisfies criteria; ◐ = partially satisfies criteria; ○ = least satisfies criteria; ARARs = applicable or relevant and appropriate requirements.

a. An alternative must meet the threshold criteria to be considered for selection. Each alternative either fully satisfies the criteria or does not.

b. Cost is reported in net present value.

Burn Pits (TSF-03 and WRRTF-01)

Contaminant of Concern
lead

Alternatives Evaluated
1. Limited Action
2. Native Soil Cover
3. Excavation and Disposal
4. Excavation and Soil Washing

Preferred Alternative: 2 - Native Soil Cover

Advantages
- Easy to implement
- Cost effective

Disadvantages
- Does not reduce contaminant toxicity or volume
- Potential for worker exposure

Total Cost (in millions; net present value)

Capital	$ 3.9
Operating and Maintenance	2.1
Total	$ 6.0

Burn Pits

The two Test Area North Burn Pit sites (TSF-03 and WRRTF-01) were used for open burning of construction debris. The TSF-03 pit was used from 1953 to 1958; the WRRTF-01 pits were used from 1958 to 1975. Because of the similarities between the two sites, they were evaluated together.

The TSF-03 burn pit is located in the northeast corner of the Technical Support Facility, outside the facility fence (see Figure 4).[33] The site is covered with 2 to 6 feet of clean soil, which eliminates the potential for worker exposure.

The four WRRTF-01 burn pits are approximately 2,700 feet north of WRRTF, outside the facility fence (see Figure 5).[34] The pits are covered with approximately 6 inches to 9 feet of clean soil and revegetated.

The burn pits are contaminated with lead. While lead does not present a risk that can be calculated using risk guidelines, EPA has established a residential screening level to address the human health risk caused by lead. Contamination within the top 10 feet of soil could be a risk to a hypothetical future resident if the subsurface soil was disturbed and brought to the surface. Recent investigation into available records indicates that other toxic substances, such as beryllium, chlorinated solvents, and used oils, were burned in the pits. Four alternatives were evaluated for remediation of the Burn Pit sites.

Alternative 1 - Limited Action

Description. Under Alternative 1, existing management practices would continue. Fencing and institutional controls would also be implemented.

Evaluation. Alternative 1 would comply with the regulations and protect human health and the environment after the period of institutional control. Under Alternative 1, contamination would be left in place, resulting in low long-term effectiveness. This alternative would not reduce toxicity, mobility, or volume through treatment. Because the management practices are already in place, implementability would be high. Short-term effectiveness would be high, because no handling or transport of contaminants would be required.

Alternative 2 - Native Soil Cover (Preferred ☑)

Description. Under Alternative 2, a uniform layer of clean soil and surface vegetation or rock would be added to limit direct contact with contaminated soil. Environmental monitoring would be conducted and access restriction maintained to preserve the protectiveness of this alternative.

Evaluation. Alternative 2 would protect human health and the environment and comply with the regulations. Contamination would be left in place and contained. This alternative would not reduce toxicity, mobility, or volume through treatment; however, it would minimize exposure to lead contamination, at least through the period of institutional control. There would be a possibility for worker exposure during construction of the cover, reducing the short-term effectiveness. Implementability would be high, given INEEL's success using soil covers.

Alternative 3 - Excavation and Disposal

Description. Under Alternative 3, contaminated soil exceeding the remediation goal would be removed and disposed of. The excavation would be backfilled with clean soil. Two variations of Alternative 3 were considered. Under Alternative 3a, the contaminated soil would be disposed of off-site, while under Alternative 3b, the contaminated soil would be disposed of on-site. For both variations, it is assumed that no treatment would be required.[35]

Alternative 3b would use sampling and analysis before excavation to determine whether the soil meets disposal criteria or requires treatment. Treatment options would be evaluated based on characterization data.

Evaluation. Both variations of Alternative 3 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because the contaminants would be removed. Alternative 3a would not reduce toxicity, mobility, or volume of the contaminants through treatment; however, it would remove all contamination from the site. Under Alternative 3b, treatment would be performed if required, reducing contaminant toxicity and mobility. There would be a possibility for worker exposure during excavation and transportation to the disposal facility, reducing the short-term effectiveness. Implementability would be high since reliable technologies are available for excavation and treatment.

The principal ARAR evaluated for the Burn Pits sites was the Hazardous Waste Management Act closure requirements.

Alternative 4 - Excavation and Soil Washing

Description. For Alternative 4, all contaminated soil would be excavated. Clean soil would be used to backfill the site after excavation. Lead-contaminated soil at the burn pits would be treated at the INEEL using soil-washing technology and the treated soil would be returned to the excavation. The recovered lead would be recycled or disposed of at an approved repository. A treatability study to evaluate the technical feasibility of this alternative would be required.

Evaluation. Alternative 4 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because the contaminants would be removed. There would be a possibility for worker exposure during excavation and treatment activities, reducing the short-term effectiveness. Implementability would be difficult because a soil-washing treatability study would have to be conducted on the INEEL soil to further evaluate its technical feasibility.

Preferred Alternative for the Burn Pits

The preferred alternative for the Test Area North Burn Pit sites (TSF-03 and WRRTF-01) is Alternative 2 – Native Soil Cover. This alternative would be easy to implement and would achieve the remedial action objectives. Containment of contaminants, followed by monitoring and access restrictions, would increase long-term protective-

Preferred Alternative for the Burn Pits

☑ **Alternative 2 – Native Soil Cover**

subsidence: Natural sinking or settling of soils.

ness. Short-term effectiveness would be moderate because ***subsidence*** in the pits poses some potential for worker exposure to contaminants during construction. Alternative 2 would use sampling and analysis to design the soil cover to ensure it would be completely protective of human health and the environment. If it were determined that a fully protective cover would not be cost effective, then one of the Alternative 3 variations would be selected as the preferred alternative. Table 6 shows the Burn Pits alternatives.

Table 6. *Comparison of alternatives for the Burn Pits. The preferred alternative ☑ is shaded.*

	Alternatives				
		Native Soil	Excavation and Disposal		Excavation and Soil
	Limited Action	Cover	Off-site	On-site	Washing
	1	☑2	3a	3b	4
Threshold Criteria[a]					
Overall protection	Ⓥ[b]	Ⓥ	Ⓥ	Ⓥ	Ⓥ
Compliance with ARARs	Ⓥ[b]	Ⓥ	Ⓥ	Ⓥ	Ⓥ
Balancing Criteria					
Long-term effectiveness	○	◐	●	●	●
Short-term effectiveness	●	◐	◐	◐	◐
Reduction of toxicity, mobility, or volume	○	○	○	◐	◐
Implementability	●	●	●	●	◐
Costs (dollars in millions)[c]					
Capital costs	$ 1.2	$ 3.9	$ 13.9	$ 6.0	$ 18.3
Operating and maintenance costs	1.8	2.1	0.0	0.0	0.0
Total cost	$ 3.0	$ 6.0	$ 13.9	$ 6.0	$ 18.3

Key: Ⓥ = meets criteria; ● = best satisfies criteria; ◐ = partially satisfies criteria; ○ = least satisfies criteria; ARARs = applicable or relevant and appropriate requirements.

a. An alternative must meet the threshold criteria to be considered for selection. Each alternative either fully satisfies the criteria or does not.

b. Because this alternative does not assume maintenance of the clean soil cover, there is a potential for biointrusion.

c. Cost is reported in net present value.

Mercury Spill Area

The Mercury Spill Area (TSF-08) is a section of railroad bed near the southwest corner of the TAN-607 building (see Figure 4).[36] The area was contaminated in 1958 by a large mercury spill from the Heat Transfer Reactor Experiment-III engine. A removal action was done in 1994, and the area was backfilled with clean gravel.[37] Post-removal sampling showed low levels of mercury at least 2.5 feet below ground surface. The site is approximately 40 feet by 10 feet.

phytoremediation: The use of plants to remove contamination from soils.

This site has been selected to be used for a treatability study to evaluate plant uptake factors and rates for ***phytoremediation***. Based on the results of this study, a determination will be made as to subsequent action, if required.

Fuel Leak

The Fuel Leak site (WRRTF-13) was contaminated by leaks from tanks and piping (see Figure 5).[38] The tanks supplied diesel fuel and heating oil to buildings within the facility. Several tanks and transfer lines, along with contaminated soil, were removed and disposed of in the early 1990s, and the excavated areas were backfilled with clean soil.[39] However, some contamination remains in soil below and adjacent to several buildings currently in use. Because some of the contamination is within the top 10 feet of soil, the site poses a potential risk to a hypothetical future resident through construction of a basement. Current and future worker exposure to the subsurface contamination is eliminated by the backfill material. Four alternatives were evaluated for remediation of the Fuel Leak site.

Fuel Leak
(WRRTF-13)

Contaminant of Concern
oils and diesel fuel

Alternatives Evaluated
1. Limited Action
2. Containment
4. Excavation and Land Farming
5. In Situ Biodegradation using Bioventing

Preferred Alternative: 4 - Excavation and Land Farming

Advantages
- Removal of contaminants results in high long-term effectiveness
- Cost effective

Disadvantages
- Potential for worker exposure
- Implementation is hindered by existing buildings

Total Cost (in millions; net present value)

Capital	$ 0.8
Operating and Maintenance	0.0
Total	$ 0.8

Alternative 1 - Limited Action

Description. Under Alternative 1, existing management practices, including institutional controls and environmental monitoring, would continue.

Evaluation. Alternative 1 would protect human health and the environment and comply with the regulations. Under Alternative 1 contamination would be left in place, resulting in low long-term effectiveness. Short-term effectiveness would be high, because workers would not be exposed to contaminants. This alternative would not reduce toxicity, mobility, or volume through treatment. Implementability would be high because the management practices are already in place.

The numbering of alternatives in this proposed plan is not always sequential due to some alternatives being screened out during the feasibility study.

Alternative 2 - Containment

Description. Alternative 2 would consist of covering the contaminated site with a native soil cover. The cover would consist of a layer of INEEL soil with surface vegetation. Institutional controls would be required to maintain the cover.

Evaluation. Alternative 2 would protect human health and the environment and would comply with the regulations. Contamination would be left in place; however, it would be contained, resulting in moderate long-term effectiveness. This alternative would not reduce toxicity, mobility, or volume through treatment; however, it would prevent the spread of contamination from the site. There would be a possibility for worker exposure during construction of the cover, reducing the short-term effectiveness. Implementability of this alternative would be low since the alternative could not be implemented until some time in the future when nearby buildings are removed.

Alternative 4 - Excavation and Land Farming (Preferred ☑)

Description. Under Alternative 4, the contaminated soil would be excavated down to approximately 10 feet or to the maximum depth at which contaminant concentrations exceed remediation goals, whichever is less. Sampling would be performed before excavation to determine what volume of contaminated waste must be removed, based on the State of Idaho Risk-Based Corrective Action Guidance. Clean soil would be used to backfill the site. The contaminated soil would undergo ***land farming*** at the Central Facilities Area land farm.

land farming: Mixing contaminated material with soil to stimulate growth of microbes that break down contaminants into non-toxic byproducts.

Evaluation. Alternative 4 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because the contaminants would be removed. There would be a possibility for worker exposure during excavation and transportation, reducing the short-term effectiveness. Land farming would reduce toxicity and mobility through treatment. Implementability would be moderate because the site is near existing buildings and structures, and the contamination is under an existing roadway and parking area. The cost of this alternative would be less than the cost of other alternatives considered at this site.

Alternative 5 - In Situ Biodegradation using Bioventing

Description. Under Alternative 5, the contaminated soil would be remediated through in situ biodegradation. The toxic contaminants would be broken down through aerobic biodegradation by microorganisms naturally present in the soil. To increase the amount of oxygen available for aerobic activity, a network of ***bioventing*** wells would be installed. Air would be pumped into the bioventing system to stimulate faster biodegradation.

bioventing: A method of increasing the rate at which microorganisms that exist naturally in the soil break down contaminants.

Evaluation. Alternative 5 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because the contaminants would be reduced or eliminated. The toxicity and volume would be reduced. Risks to workers and the environment would be moderate. Implementability would be high. The technology uses standard drilling and construction equipment, but additional site characterization will be required to design and implement the bioventing system. The cost would be greater than the other alternatives.

Preferred Alternative for the Fuel Leak

Preferred Alternative for the Fuel Leak

☑ Alternative 4 – Excavation and Land Farming

The preferred alternative to remediate the Fuel Leak site (WRRTF-13) is Alternative 4 – Excavation and Land Farming. It would protect human health and the environment and would comply with regulations. Long-term effectiveness would be high, because the contaminants would be removed. The possibility for worker exposure reduces the short-term effectiveness. Implementability may be complicated by the adjacent buildings and roads. Upon decommissioning of the buildings in this area, any remaining contaminated soil will be assessed as part of the decommissioning effort. Table 7 shows the Fuel Leak alternatives.

The principal ARAR evaluated for the Fuel Leak site was the State of Idaho Risk-Based Correction Action guidance.

Table 7. Comparison of alternatives for the Fuel Leak. The preferred alternative ☑ is shaded.

	Alternatives			
	Limited Action 1	Containment 2	Excavation and Land Farming ☑4	In Situ Biodegradation using Bioventing 5
Threshold Criteria[a]				
Overall protection	Ⓨ[b]	Ⓨ	Ⓨ	Ⓨ
Compliance with ARARs	Ⓨ	Ⓨ	Ⓨ	Ⓨ
Balancing Criteria				
Long-term effectiveness	○	◐	●	●
Short-term effectiveness	●	◐	◐	◐
Reduction of toxicity, mobility, or volume	○	○	●	●
Implementability	●	○	◐	●
Costs (in millions)[c]				
Capital costs	$ 0.6	$ 0.7	$ 0.8	$ 1.9
Operating and maintenance costs	0.8	0.9	0.0	0.0
Total Cost	$ 1.4	$ 1.6	$ 0.8	$ 1.9

Key: Ⓨ = meets criteria; ● = best satisfies criteria; ◐ = partially satisfies criteria; ○ = least satisfies criteria; ARARs = applicable or relevant and appropriate requirements.

a. An alternative must meet the threshold criteria to be considered for selection. Each alternative either fully satisfies the criteria or does not.

b. Residual contamination exceeds the remedial action objective; hence, long-term institutional controls would be required.

c. Cost is reported in net present value.

Sites Not Requiring Cleanup

The Agencies agree that 53 sites at Test Area North do not require cleanup.[40] These sites have been categorized as follows:

Sites with No Evidence of Hazardous Material Disposition. The investigation determined that at 15 sites there is no evidence that any hazardous materials were ever present.

Sites with No Exposure Pathway for the Contamination. At four sites, the investigation found no means for contaminants present to come in contact with the environment, animals, or humans.

Sites with Contamination Not Sufficient to Cause Unacceptable Risk. At 12 sites, the investigation found that suspected contaminants were within established background levels. The agencies recommend no further action for these 12 sites because potential concentrations of contaminants and associated risks do not require cleanup action or further investigation.

Sites Determined Not to be CERCLA Waste Sites. The investigation found that 11 sites do not meet CERCLA criteria to be listed as inactive hazardous waste sites and are not listed in this Proposed Plan.

Sites Remediated in Previous Actions. At 11 sites remedial actions were completed, and the sources of contamination no longer exist.

Sites with No Evidence of Hazardous Material Disposal

- IET Burial Pit (IET-02)
- IET Septic Tank and Filter Bed (IET-08)
- LOFT Injection Well (LOFT-04)
- LOFT Septic Tank and Drain Field (LOFT-09)
- LOFT Dry Well (LOFT-13)
- SMC Septic Tank and Drain Field (SMC-01)
- TSF Brine Pit (TSF-16)
- TSF Septic Tank (TSF-30)
- Fuel Tank (TSF-34)
- Acid Sump (TSF-35)
- Rubble Pile (TSF-40)
- Scrap Yard (TSF-41)
- TSF Acid Pit (TSF-31)
- AEC Burial Pit (TSF-45)
- WRRTF Septic Tank and Sand Filters (WRRTF-07)

Sites with No Exposure Pathway for the Contamination

- IET Stack Rubble Site (IET-04)
- TSF Acid Neutralization Sump north of TAN-602 (TSF-12)
- TAN-607A Room 161 Contaminated Pipe (TSF-42)
- RPSSA Building 647/648 and Pads (TSF-43)

Sites with Contamination Not Sufficient to Cause Unacceptable Risk

- IET Injection Well (IET-06)
- LOFT Disposal Pond (LOFT-02)
- LOFT Landfill (LOFT-16)
- TSF Service Station Spill (TSF-02)
- Drainage Pond (TSF-10)
- TSF Clarifier Pits (TSF-11)
- TSF Railroad Turntable (TSF-22)
- TSF Paint Shop Drain (TSF-27)
- TSF Sewage Treatment Plant and Sludge Drying Beds (TSF-28)
- TSF Acid Pond (TSF-29)
- TSF Contaminated Well Water Spill (TSF-37)
- WRRTF Injection Well (WRRTF-05)

Sites Determined Not to be CERCLA Waste Sites

- IET Pond and Ditch
- IET Gravel Pit
- IET Burn Pit east of IET
- LOFT Burn Pit northwest of LOFT
- TSF Burn Pit southwest of TSF-05 Injection Well
- TSF Radioactive Spills on Bear Boulevard
- Radioactive Spill on Lincoln Boulevard
- Sand Piles south of TSF
- WRRTF Transite Area
- Broken Pipe in Berm east of TAN-633
- Buried Asbestos behind the Hanger at SMC

Sites Remediated in Previous Actions

- LOFT Foam Solution Tank (LOFT-07) (remediated in 1994)
- TSF Acid Neutralization Pits north of TAN-649 (TSF-17) (remediated in 1993)
- TSF Caustics Tank V-4 (TSF-19) (remediated in 1993)
- TSF Neutralization Pits north of TAN-607 (TSF-20) (remediated in 1993)
- TSF Valve Pit (TSF-21) (remediated in 1993)
- TAN-603 French Drain (TSF-36) (remediated in 1994)
- TSF Bottle Site (TSF-38) (remediated in 1994)
- IET Hot Waste Tank (IET-07) (remediated in 1985)
- WRRTF Radioactive Liquid Waste Tank (WRRTF-04) (remediated in 1993)
- LOFT North Transformer Yard PCB Spill and Soil Site (LOFT-12) (remediated in 1994)
- TSF Diesel Fuel Pipeline Leak (TSF-44) (remediated after each release)

References

The following list of source material is provided for readers who want more detailed information than is presented in this document. These documents are available in the INEEL Administrative Record. Locations of the Administrative Record are listed in the margin of page 2. The titles of the two primary sources (see entries 1 and 2) have been shortened in subsequent entries for convenience.

1. *Comprehensive Remedial Investigation and Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory,* November 1997, DOE/ID-10557 (*Comprehensive Investigation Report*).

2. *Comprehensive Remedial Investigation and Feasibility Study Supplement for Test Area North, Operable Unit 1-10, at the Idaho National Engineering and Environmental Laboratory,* November 1998, DOE/ID-10557 (*Comprehensive Investigation Supplement*).

3. *Comprehensive Investigation Report,* Section 4.

4. *Agreement-in-Principle between the Shoshone-Bannock Tribes and the U.S. Department of Energy,* August 6, 1998.

5. *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (FFA/CO), December 9, 1991, Table A-2.

6. *Comprehensive Investigation Report,* Table 1-1 and Appendix B, Table B-1.

7. *Record of Decision for the Technical Support Facility Injection Well (TSF-05) and Surrounding Groundwater Contamination (TSF-23) and Miscellaneous No Action Sites Final Remedial Action,* August 18, 1995, Operable Unit 1-07B, 10139.

8. *Comprehensive Investigation Report,* Sections 6.6.5 and 8.4.11.

9. *Comprehensive Investigation Report,* Section 4.1.6.

10. *Comprehensive Investigation Report,* Section 4.1.9.

11. *Comprehensive Investigation Report,* Section 9.

12. *Comprehensive Investigation Report,* Section 6.

13. *Comprehensive Investigation Report,* Section 7.

14. *Comprehensive Investigation Report,* Section 8.

15. *Comprehensive Investigation Report,* Section 12.1.

16. *Comprehensive Investigation Report,* Table 12-1.

17. *Comprehensive Investigation Report,* Section 9.3.

18. *Comprehensive Investigation Report,* Section 9.4.

19. *Risk-Based Corrective Action Guidance Document for Petroleum Releases,* State of Idaho Department of Environmental Quality, August 1996.

20. *Comprehensive Investigation Report,* Sections 12.2.1, 12.4.1, 12.6.1, and 12.8.1.

INEEL environmental restoration documents can be obtained from the Administrative Record located in Idaho Falls, Boise, and Moscow; or on the Internet (http://ar.inel.gov/home.html); or by calling the INEEL toll-free phone number (1-800-708-2680).

21. *Comprehensive Investigation Report,* Section 12.1.7.

22. *Comprehensive Investigation Report,* Sections 4, 11, and 12.

23. *Comprehensive Investigation Report,* Figure 4-23.

24. *Comprehensive Investigation Report,* Section 10.1.7.

25. *Comprehensive Investigation Report,* Figure 4-29.

26. *Comprehensive Investigation Report,* Section 4.1.9.

27. Letter from Gregory B. Cotten, Parsons Infrastructure and Technology Group, Inc., to Mr. Thomas J. Haney, Lockheed Martin Idaho Technology Company, December 2, 1996, regarding Summary Report for OU 10-06 Rad Soils Removal, 21:10:009-96.

28. *Comprehensive Investigation Supplement,* Section 6.1.

29. *Comprehensive Investigation Report,* Figure 4-21.

30. Letter from Gregory B. Cotten, Parsons Infrastructure and Technology Group, Inc., to Mr. Thomas J. Haney, Lockheed Martin Idaho Technology Company, December 2, 1996, regarding Summary Report for OU 10-06 Rad Soils Removal, 21:10:009-96.

31. *Comprehensive Investigation Report,* Figure 4-32.

32. *TAN TSF-07 Pond Radium-226 Concentrations and Corrections,* LMITCO Engineering Design File ER-WAG1-08, INEEL/EXT-98-00505, June 1998.

33. *Comprehensive Investigation Report,* Figure 4-3.

34. *Comprehensive Investigation Report,* Figure 4-5.

35. *Comprehensive Investigation Supplement,* Section 6.2.4.

36. *Comprehensive Investigation Report,* Figure 4-34.

37. *DOE Idaho Operations Office Lead Agency Action Memorandum Removal Action – Test Area North, OU 1-08, TSF-08, Mercury Spill Sites 13B and 13C at the Idaho National Engineering Laboratory,* October 1, 1994, 5793.

38. *Comprehensive Investigation Report,* Figure 4-40.

39. *Work Plan for Waste Area Group 1 Operable Unit 1-10 Comprehensive Remedial Investigation/Feasibility Study,* March 1, 1996, DOE/ID-10527.

40. *Comprehensive Investigation Report,* Table 1-1.

For More Information

If you have any questions, would like to request a briefing, or seek additional information, you can contact the Agencies or the INEEL Community Relations Plan Office.

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Call the INEEL Community Relations Office at 1-800-708-2680 or 208-526-7225

Write the INEEL Community Relations Office at P.O. Box 2047, Idaho Falls, ID, 83403-2047

E-mail Ann Riedesel, INEEL Community Relations representative for Waste Area Group 1, at amh@inel.gov

> The revised Proposed Plan will be available for the 30-day public comment period beginning November 23. The public is encouraged to review and comment on the information presented in the Proposed Plan. Public meetings are not scheduled during the public comment period; however, briefings about the revised proposed plan will be provided upon request.

Many recommendations were received during the original WAG 1 Proposed Plan public comment period concerning the document's readability (format, wording, and use of acronyms), technical information, candor, and references. As a result, substantial changes in format, content, and language have been incorporated into this plan. The Agencies extend their thanks to the members of a citizens focus group, and many others, who have spent many hours reviewing draft documents and offering suggestions for improvement.

1 800
708-2680

Summary of Preferred Alternatives

The following summary is provided for the reader's assistance. The reader should consult the detailed explanations provided in this document for more information on the preferred alternatives and all other alternatives. The Mercury Spill site is not included (as discussed on page 22).

Sites	Reader Notes
V-Tanks (TSF-09 and TSF-18) Description: Underground storage tanks (400- to 10,000-gallon) containing liquids and sludge contaminated with radionuclides, heavy metals, PCBs, and organic compounds, as well as contaminated adjacent soil Preferred Alternative: 4 - In Situ Vitrification Total Cost: $10.5 million (net present value) Comments: Testing after vitrification would confirm destruction of organic compounds and PCBs and complete immobilization of heavy metals and radionuclides	
PM-2A Tanks (TSF-26) Description: Underground storage tanks (50,000-gallon) containing sludge contaminated with radionuclides, heavy metals, PCBs, and organic compounds, as well as contaminated adjacent soil Preferred Alternative: 3d - Soil Excavation, Tank Content Vacuum Removal, Treatment, and Disposal Total Cost: $6.3 million (net present value) Comments: Tanks would remain in place but be decontaminated	
Soil Contamination Area South of the Turntable (TSF-06, Area B) Description: Surface soil patches contaminated by windblown radioactive particles Preferred Alternative: 3a - Excavation and On-Site Disposal Total Cost: $2.5 million (net present value) Comments: Would remove contaminated soils to a centralized repository	
Disposal Pond (TSF-07) Description: Five-acre area within 35-acre pond, contaminated with cesium-137 Preferred Alternative: 1 - Limited Action Total Cost: $1.6 million (net present value) Comments: Long-term monitoring and institutional controls would be required, since contamination remains	
Burn Pits (TSF-03 and WRRTF-01) Description: Construction debris burn sites with lead contaminating the top 10 feet Preferred Alternative: 2 - Native Soil Cover Total Cost: $6.0 million (net present value) Comments: Long-term monitoring and institutional controls would be required, since contamination remains	
Fuel Leak (WRRTF-13) Description: Soil contaminated by leaks from tanks and piping; contamination extends under an existing road and parking area Preferred Alternative: 4 - Excavation and Land Farming Total Cost: $0.8 million (net present value) Comments: Would remove and treat contaminated soils	

Comments (continued): ______

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Please return this form by December 22, 1998

What's Your Opinion?

The agencies want to hear from you to decide what actions to take at Test Area North.*

Comments: ______________________________

(Continued on reverse)

* If you want a copy of the Record of Decision and Responsiveness Summary, make sure your mailing label is correct.

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